Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

stone mountains in which are found twelve caves and grottos, most of them interesting, and some of them more than commonly attractive. Brünn is the convenient point of departure for those who wish to visit these picturesque mountains and their fine caves; and this little book tells how they may be reached, and gives many facts about them that are not only interesting but are also of scientific quality. In some of the caves are remains of fossil animals, and particularly of the extinct cave bear, but the best specimens, naturally, have been taken to the museum at Vienna.

Geologischer Führer durch Bosnien und die Hercegovina. By Dr. Friedrich Katzer, Government Geologist. 280 pp., 8 maps, 64 illustrations, and Index. The Government, Sarajevo, Bosnia, 1903.

This attractively-produced and authoritative little work was especially prepared for the Ninth International Geological Congress at Vienna last fall, whose programme included an excursion through Bosnia and Herzegovina, where the members had an opportunity to enjoy the scenic beauty of these regions and witness their remarkable development since the influence of Austria-Hungary became predominant. The book was prepared to facilitate the efforts of the members in their attention to the geology of the provinces traversed. After a short review of the subject the geological conditions along the extensive routes followed by the excursionists in September last are described in greater detail. Besides a map of the rail and wagon routes there are seven others, which are excellent specimens, showing the rock formations of more or less extended areas visited. The illustrations include many picturesque photographs and geological profiles. The book is an addition to the rather limited scientific literature relating to these provinces.

L'Évolution Comparée des Sables, par Jules Girard. Pp. 121, pl. XII, 40 figs. in text. Large 8vo. Paris, F. R. de Rudeval, 1903.

In this essay the author has collected observations from a wide range of literature, and has combined them with extensive personal observations into a valuable and interesting compend of the geographical action of sands under all conditions. The subject is considered under four heads: erosion, meteoric abrasion, dunes, and alteration of coast-lines. The article well repays careful reading, and the abundant references give an admirable review of current literature, and indicate a surprising number of investigations of a subject that at first thought seems rather narrow in scope.

Erosion.—Of the three products of the decomposition of rocks, namely: sands, muds, and carbonate of lime, sands are the most important agents of erosion. The erosive work of the atmosphere is greatly affected by the amount of rainfall, and the amount of rainfall varies according to the altitude, increasing on an average 1 cm. for every 10 m. of elevation. The average rainfall for the plains of Europe is estimated at 575 mm. per year; while for the mountainous regions it is 1,300 mm. On the plains, forests have the effect of increasing the rainfall, but of retarding the erosion. Sands, furthermore, have been and are the powerful tools of abrasion under the pressure of glacial ice.

The underground circulation of water sometimes produces important surface changes, especially where beds of sand rest on impermeable rocks. Landslides and small movements of the ground are numerous. Quicksands result from water impregnating a bed of sand composed of pure and fine grains of quartz. The unstable, flowing condition of the sands results when the bed contains not less than 20% by weight of water thoroughly mixed with the sand. Disastrous mud-flows have resulted from the soaking of beds of silt with excess of water.

Meteoric Abrasion.—Meteoric abrasion is much influenced by the thermal conditions of the atmosphere. The most favourable regions for such abrasion are deserts and arid or semi-arid districts. Wind-driven sands have carved the granites of the desert of the Gobi, the sandstones of the deserts of Africa, the sandstones of Monument Park, Colorado, and other portions of the Rocky Mountains into forms which are typical of all arid regions where the rocks are of varying degrees of hardness. The progressive desiccation of some regions, that of the basin of the Caspian, for example, is partly due to the wind-driven sands filling lakes or depressions where water has gathered. Where arms of the sea have been shut off by the driven sands, extensive salt deposits have been made, as along the Isthmus of Suez.

The musical sands of the peninsula of Sinai, the desert of Peru, and elsewhere are due to the surface drying of clean sands and the gliding of the top layers over those beneath. Floating sands have been observed in many parts of the world—a phenomenon which is due to the adhesion of minute bubbles of air to the particles of dry sand blown out upon the surface of the water.

The rapid changes of temperature upon the barren expanses of a sandy desert produce terrible wind-storms. In these storms, upon a region like the Sahara, the wind sometimes attains a velocity of 30 m. per second—sufficient to raise vast quantities of sand and transport them from place to place. The whirlwinds accompanying the tempests raise the sand in columns, and sometimes several of these funnel-shaped columns are to be seen traversing the desert at once. The clouds of dust driven before the winds are terrible features of a journey through such regions. The finest dust remains in suspension in the atmosphere for days, and is transported in vast quantities from the Sahara to the south of Europe. The air to the westward of Africa is likewise loaded at times with fine dust. The map (Plate III) shows the distribution in time and place throughout Eurasia of noteworthy dust-storms. The sand driven by these winds is a powerful agent of abrasion.

The study of the vast deposits of loess in the valley of the Hoang-Ho, the Mississippi, and elsewhere has led most observers to the conclusion that it is a result of eolian action or of eolian combined with river action, although there has been, and still is, much discussion of the subject. The author seems to incline to a purely atmospheric origin for these peculiar deposits.

Dunes.—In the chapter on dunes the author discusses first the mode of formation. Scientific observation upon the accumulation of the sands is recent and the terminology defective, although the Sahara and other deserts and the dunes of the sea-coast have long received some notice. The form and direction of dunes are dependent upon the force and velocity of the winds. In some cases it has been possible to make an artificial section of a dune which has given an indication of the intensity and direction of the ancient currents of air. The intensity of the wind is the primary cause of the transportation of sand, but the direction of the prevailing winds, the dryness of the atmosphere, and the composition of the soil are factors which enter into the formation of dunes. Their height is as variable as the causes which lead to their formation. The highest dune of the coasts of France is 158 m.; while in Tunis some are known which exceed 200 m. in altitude, and in the Great Sahara there are some which are much higher.

The observations which have been carried on at the Grand Erg show that the humidity of the sub-soil has much to do with the location of a dune; even a slight degree of humidity causes the grains to adhere and to resist the action of the wind, thus forming a favourable spot for an accumulation. Capillarity, too, has had its effect in distributing the humidity of the soil. The mounds of sand form reservoirs of water, increasing humidity near their bases, and thus favouring vegetation on their lower slopes. This principle of the agglomeration of the sands by humidity cannot, however, be extended to all regions of dunes. The term "erg" is of topographic use throughout the Sahara to designate a sandy region, large or small, flat or undulating, covered with dunes or traversed by hills. The Grand Erg comprises an area of about 47,000 square miles, in which there is a perfect wilderness of chains of dunes. The large dunes of the region show a considerable relative degree of stability.

The form of dunes varies according to the character of the winds. Where whirlwinds prevail the forms are irregular. Where the direction of the wind is constant the side of impact is abrupt, while the opposite side shows a more gentle slope. Throughout the Grand Erg, the elongated cirque, with four summits, two principal cols and two secondary points, is a characteristic form. One such star-shaped dune attains an altitude of 523 m. Pure sands, without mixture of earthy dust, form elongated dunes, with semicircular concave heads toward the direction from which the prevailing wind comes.

The author describes the effect of vegetation in arresting the migration of dunes, and gives a list of five plants—*Arundo arenaria*, *Hierochloa utriculata*, *Ammophila arenaria*, *Elymus arenarius*, and *Panicum amarum*—which have been used with good effect in France, Chili, and Massachusetts, and describes the woven barriers which have been used in Northern Germany for the same purpose.

The Alteration of Shore-lines.—Beginning with the origin of sea-beaches through breaking up of rocks and the formation of gravel and sand through the action of waves, the author considers the formations from coarse above to fine below, grading out to the edge of the continental shelf, where the deep-sea deposits of ooze begin. The inclination of the surface of a beach never exceeds 41°; while along the coast of Belgium slopes have been measured which are as low as 3 or 4 mm. to the metre for long distances. The formation of ripple-marks follows the laws of wave motion, and the interference of two systems of waves produces the somewhat angular sandpockets where the configuration of the shore concentrates the motion. The sand banks near the mouth of the Gironde River have been mapped and studied with care for two centuries. Plate VIII shows some of the remarkable changes of shore-line which have taken place during the period. The Peninsula of Médoc is being gradually destroyed, and the opposite bank of the river is being correspondingly extended.

The coasts and islands of the North Sea furnish instructive examples of the constant changes taking place along sandy shores.

Cape Sable Island and Cape Canaveral are cited among the many sandy islands and points along the Atlantic coast of North America as showing the constant alteration resulting from the action of winds, waves, and currents. In this connection the important matter of the formation of offshore bars and barrier islands is illustrated by descriptions and maps of typical localities on the Black Sea, Sea of Azov, Baltic Sea, Arctic Ocean, and elsewhere.

The distribution of materials brought down by rivers is typified on a large scale by the action of the Mississippi, which is extending its delta at the rate of 8 km. in a century. The action of the rivers of the west of France, especially the Gironde and the Loire, is given more in detail. The Gironde receives from the Garonne and the Dordogne and distributes along the seacoast about 5,000,000 cubic metres of sandy mud per annum, or an average of 13,700 cubic metres per day. This material and that from the Loire have greatly changed the coast within historic times. The prevailing currents set from south to north along the coast. Bocage, La Rochelle, and other flourishing ports of earlier times are now far from the sea; while the ancient bay of Poitou is now a marsh.

The Rhone carries into the Mediterranean 17,000,000 cubic metres of sand and mud per year, or 2,000 cubic metres per hour. Plate XII shows the changes which have been wrought within historic times by the deposition of this sediment. The author notes also the transformation which has taken place at the mouths of the Tiber, the Po, and the Nile. In all cases the lakes formed in the deltas by the changes of the river-bed are an important feature of the development.

Accepting the general continental shore-lines as being determined by fracture lines of the lithosphere, rocky coasts appear as the ancient coasts and the alluvial plains as the new. The coast of Maine has given Gulliver the opportunity of working out "cycles and epicycles" of erosion. Elevated beaches showing former extension of the sea are very common. The "sand åsars" of Sweden, which are elongated ridges of sand, are held by some observers to mark the courses of ancient glacial torrents.

The shores of the English Channel and the coast of Holland have been studied for many years, and the changes therein have been mapped with care. The French shore of the Channel has furnished much sand to the coast of Belgium and Holland. The general opinion that the coast of Belgium has been essentially modified during the past century has been proved incorrect. The coast of Holland, on the other hand, has changed considerably through the artificial introduction of two disturbing elements—the cutting of the ship canal from Rotterdam across the Hook of Holland to the sea and the construction of the port of Ijmuiden at the ocean end of the canal. The jetties at Ijmuiden have caused the deposition of a triangular area of sand extending 3 km. alongshore and 450 m. into the sea. In general, during the past half century the sea has gained upon the land, cutting into the dunes and increasing the slope of the beaches.

The effects of a single great storm may be very extensive. The tempest of December, 1894, caused the highest tide known in a hundred years. The dunes at Scheveningen were partly washed away; the stone facing of the great dike of the Helder was torn up over an area of 5,000 square metres. Toward the north certain lines of dunes were entirely washed away. At Callanstoog the sea burst through the dunes and inundated a large area.

E. O. H.

NOTES AND NEWS.

EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS.—The summer vacation being near at hand, it is thought well to remind the Fellows that this Society will entertain the foreign delegates to the Congress at a dinner on the 14th of September, and that tickets may be secured in advance by those who desire to be present on that occasion.

It is hoped that many of the Fellows will arrange to take part in the steamboat excursion to Fishkill on the 15th of September.

THE PERMANENT INTERNATIONAL ASSOCIATION OF NAVIGATION CONGRESSES publishes Papers, Proceedings, and other documents.

Permanent Members pay a yearly subscription of 10 francs (8 shillings, or 2 dollars).

Temporary Members pay a subscription of 25 francs (£1, or $5).

The Offices are at 38 Rue de Louvain, Brussels, Belgium. The Office of the Members representing the United States by appointment of the State Department is in the Army Building, 39 Whitehall Street, New York. These representatives are: Col. C. W. Raymond, U. S. A.; Maj. H. F. Hodges, U. S. A.; Maj. J. C. Sanford, U. S. A.; E. L. Corthell, C. E., John Bogart, C. E.